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Embedding sensors on balloon catheters

Nature Materials, March 7, 2011

The development of biocompatible materials that integrate sensory technologies directly into the thin membranes of balloon catheters — used in heart surgery to eliminate blockage in blood vessels — is presented in a study in rats published online this week in *Nature Materials*. These balloon catheters could be used as a less invasive surgical tool in humans, providing information about lesion depth, blood flow or localized temperature, as well as deliver cardiac therapy.

A key challenge in creating advanced surgical tools is combining useful computer chips and sensory technologies in a material that is compatible with soft surfaces of the body's internal organs. The information recorded by such materials could be critical during laborious surgeries, cutting short open-heart surgeries and helping to decrease morbidity rate.

John A. Rogers and colleagues used balloon catheters outfitted with a stretchable, interconnected network of electrodes and sensors to measure cardiac temperature, blood flow and electrophysiological data during rat cardiac operations. The authors then used radiofrequency electrodes embedded on the balloon catheters to administer controlled, local, ablation therapy — the creation of lesions in the heart to cure or control certain heart problems.

3

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